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TRADITIONAL KNOWLEDGE AS ECOLOGICAL INTELLIGENCE: AN ECOPEDAGOGY STUDY

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Abstract

Humans living in ancestral environments tend to preserve inherited habits, including rituals and daily practices rooted in local wisdom. This traditional knowledge, reflecting ecological intelligence, is at risk of fading due to the lack of educational exposure. Using qualitative methods—observation, interviews, documentation, and audio-visual records—this study explores how schools can become a platform for revitalizing ecological intelligence through traditional knowledge. More importantly, this study introduces the integration of digital literacy as a vital tool in documenting, disseminating, and preserving traditional ecological knowledge. Digital storytelling, community-based multimedia archives, and ecopedagogical content delivered via online platforms enable students not only to appreciate but also to participate in the conservation of their cultural and ecological heritage. The findings suggest that both ecological intelligence and digital literacy can be developed in synergy through project-based learning rooted in local content. This combination equips students with the cognitive and technological skills necessary to engage with global environmental issues while remaining grounded in local wisdom.

Keywords:
Traditional Knowledge, Ecological Intelligence, Ecopedagogy, Digital Literacy, Local Content Education, Conservation Pedagogy

1. Introduction

Indonesia is a country rich in indigenous traditions and ecological diversity, evidenced by countless customary rituals such as Cingcowong in West Java, Subak in Bali, Ammatoa in Bulukumba, Ma'nene' in Tana Toraja, and Ma'rimpa Salo in Sinjai. These ceremonies are part of a broader network of traditional knowledge that reflects not only cultural identity but also ecological intelligence. Indigenous knowledge— encompassing how people treat nature, engage in sustainable farming, and live in harmony with their surroundings—is a valuable legacy that must be preserved and passed on through formal education.

However, formal educational institutions have yet to become strongholds for the transmission of such knowledge. A growing concern is the declining presence of local content (muatan lokal) subjects in school curricula, resulting in a generational disconnect from traditional ecological values. Students today may visit zoos and amusement parks, but rarely are they exposed to indigenous communities or traditional villages where they can witness firsthand the values, languages, rituals, and ecological wisdom that shaped their ancestors' lives.

This disconnection is exacerbated by the lack of digital access to locally rooted knowledge. While students are increasingly literate in digital tools, their exposure to cultural and ecological content within the digital sphere remains minimal. Paradoxically, digital literacy—which is often used for entertainment or standardized learning—has not been sufficiently mobilized to revitalize traditional knowledge. As a result, ecological intelligence becomes isolated from modern technological development.

The current study is driven by this critical gap: How can ecological intelligence rooted in traditional knowledge be preserved and developed through education? How can digital literacy be leveraged to protect, document, and revitalize local wisdom within formal schooling? To answer these questions, this research adopts the lens of ecopedagogy, an educational framework that integrates critical ecological awareness, social justice, and active student engagement. By embedding traditional knowledge into school learning materials and utilizing digital platforms for preservation and dissemination, this study aims

to offer a sustainable model for integrating local content with 21st-century competencies.

In this study, we argue that the fusion of traditional knowledge and digital literacy through an ecopedagogical approach not only strengthens cultural identity and environmental awareness, but also promotes a transformative learning experience. Students become not just recipients of ecological values but also digital creators and cultural agents who can document, share, and advocate for the wisdom of their communities. The integration of digital literacy allows for the creation of digital archives, video ethnographies, and collaborative multimedia projects that serve both educational and conservation purposes.

Ultimately, this research seeks to respond to the urgent need for educational content that is both locally grounded and digitally adaptive—where students not only learn about their roots but also preserve them using the tools of the future.In line with the topic raised, with the issue encountered by the researcher that some schools no longer implement/teach mulok, some data will be displayed as follows:

Table 1.1 *Kondisi Mulok Saat ini*

No	Name of School	Still teaching	No longer teaching
1	UPT SPF SMP 24 Makassar	+	-
2	SMP ISLAM Ar-Rithah Jeneponto	+	-
3	SDIT Al-Asri Gowa	+	-
4	SMP Negeri 26 Makassar	-	+
5	SMA Negeri 1 Gowa	-	+
Important note		1. Full name of school is hidden by the provisions of research ethics; 2. Very many schools no longer teach;	

Students will get recreation to bathing places, visiting animal places and other recreational places or parks and zoos. However, students will not be accompanied by their parents to the location of the traditional village to see and feel the culture, language, uniqueness of clothing and the structure of the traditional house in a particular community. Therefore, it is important for teachers, especially schools, to remain at the forefront of developing the knowledge of each student in their respective institutions. In line with the assumptions above, several rules and research that lead to and are based on the importance of local content.

Fragment of Presidential Regulation Number 87 of 2017, Article 1 Paragraph 1 concerning PPK ... forming the character of students through the harmonization of heart, taste, thinking, sports with the involvement and cooperation between education units, families, and the community as part of the GNRM Movement; Fragment of the Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 79 of 2014 concerning local content is a study or subject that contains content and learning processes about the potential and uniqueness of the region. It is packaged so that students gain knowledge, culture, nature, and spirituality, preserve and develop regional excellence and wisdom to support national development.

Astini & Maisyaroh' Research, 2023; Mayuasti & Prahara, 2022; Darisman et al, 2023; Pulhehe, 2024; Dali, 2013; Basuki, 2011; The results of the research that have been mentioned in this paragraph have several similarities in this study. The similarities that can be mentioned include examining the same material objects, namely the discussion of the curriculum and the importance of local content in schools. The difference between this research and previous research between formal objects is that it does not offer a solution of raw materials or ready-to-eat materials to provide discussion to the law enforcement room and school stakeholders. The approach used in this study uses an ecopedagogical approach, by recognizing that traditional knowledge is a pure intelligence from nature that should be polite and teach it. In connection with the above, this research should receive more serious attention from agencies or authorized institutions as one of the efforts to anticipate the occurrence of phenomena that we do not expect.

2. Method

This research adopts a qualitative exploratory approach, utilizing methods such as field observation, semi-structured interviews, ethnographic documentation, and audiovisual recordings. Field sites include elementary to high schools in South Sulawesi and indigenous communities such as Ammatoa Kajang. These methods are consistent with qualitative inquiry in educational research (Denzin & Lincoln, 2011).

Digital tools were used strategically to enhance the process of documenting and revitalizing traditional knowledge. Software such as Flex, Lexique Pro, and multimedia editing applications were employed to:

- Capture and process oral histories and visual ethnographies;
- Develop culturally grounded digital content based on ecological practices and indigenous worldviews;
- Build accessible digital repositories of traditional knowledge for pedagogical use (Jenkins et al., 2009; Barton & Lee, 2015).

To further align with digital literacy development, the study incorporates a project-based learning component, in which students create cultural documentaries, podcasts, and visual stories. These projects serve dual purposes: reinforcing ecological intelligence and cultivating students' multimodal literacy skills (Coiro et al., 2019; Walsh, 2010).
Thematic analysis was applied to the data, framed through an ecopedagogical lens (Kahn, 2010). Triangulation methods involving educators, students, and indigenous elders were utilized to ensure credibility and contextual validity.

3. Findings

a. Decline of Local Content and Cultural Disconnection

Field observations conducted across five educational institutions in South Sulawesi revealed a consistent decline in the implementation of local content (muatan lokal). Only three out of five schools surveyed continued to teach subjects integrating regional culture, language, or ecology. Interviews with school leaders and teachers suggest that this decline is attributed to curriculum standardization pressures, lack of trained personnel, and minimal institutional incentives for promoting indigenous knowledge (Mayuasti & Prahara, 2022; Pulhehe, 2024).

This curricular omission has contributed to a weakening of students' connection to local identity and a diminished awareness of their cultural-ecological heritage. For instance, students could describe popular tourist destinations but were largely unaware of the philosophical values embedded in traditional rituals such as Ma'rimpa Salo or Ammatoa Kajang. As Tilaar (2015) argues, education should guide students toward becoming responsible members of society, rooted in the wisdom of their environment and culture.

b. Traditional Knowledge as Ecological Intelligence

Through ethnographic engagements with the Ammatoa Kajang community, this study documented several practices—such as agricultural rituals, architectural philosophy, and resistance to modernization—that embody sophisticated ecological reasoning. These practices reflect ecological intelligence, a concept defined by Goleman (2010) as the capacity to understand and respond to ecological interdependence in human behavior. Such intelligence is locally constructed and context-specific, rooted in generational wisdom rather than formalized scientific knowledge.

The study identified six key themes in traditional ecological intelligence: (1) sustainable land use; (2) cosmological time reckoning; (3) communal water management; (4) interspecies ethics; (5) sacred ecology; and (6) ecological restraint. These themes closely align with Gardner's (2013) conception of naturalist intelligence, and they provide rich pedagogical material for interdisciplinary learning in environmental science, social studies, and language education.

c. The Role of Digital Literacy in Cultural Revitalization

One of the critical contributions of this study lies in demonstrating how digital literacy can serve as a transformative bridge between traditional knowledge and modern educational practice. Students participating in the project-based learning module were introduced to digital tools such as Canva, Audacity, OpenShot Video Editor, and Flex for producing multimedia content based on local traditions. Guided by teachers and cultural practitioners, students created:

Digital documentaries showcasing indigenous farming methods; Podcasts featuring interviews with elders about cultural rituals; Illustrated storybooks narrating local legends using regional languages.

This practice of multimodal digital production enhanced student engagement and fostered a sense of ownership over cultural narratives. Moreover, it repositioned digital literacy—not merely as a technical skill—but as a critical practice of cultural conservation and ecological storytelling (Rowsell et al., 2017; Coiro et al., 2019).

d. Ecopedagogy in Practice: Dialogue, Place, and Justice

The integration of digital literacy was not approached in a technocentric fashion, but through an ecopedagogical lens. Drawing on Freire (1970) and Kahn (2010), this study operationalized ecopedagogy as a dialogical process situated in place-based inquiry and social-environmental justice. The learning modules encouraged students to critically reflect on the contradictions between modern consumer culture and indigenous sustainability ethics.

Discussion forums, field observations, and reflective journals revealed a growing awareness among students regarding the political implications of modernization and the erosion of traditional knowledge. For example, students began to question the environmental cost of tourism development in ancestral lands and suggested alternative eco-cultural tourism models grounded in community consent and local stewardship.

e. Pedagogical Implications and Model Refinement

The findings suggest that the synergistic integration of digital literacy and traditional ecological knowledge can generate a powerful educational experience—one that not only fosters environmental ethics but also cultivates identity, creativity, and civic responsibility.

The project-based design enabled differentiated learning and inclusive participation, including among students with limited prior exposure to digital media.

This convergence also aligns with global frameworks such as UNESCO's Education for Sustainable Development (ESD), which emphasizes the importance of integrating indigenous knowledge, critical thinking, and technological fluency (UNESCO, 2017). It calls for the development of teacher competencies in digital curation and place-based pedagogy, as well as institutional support for cross- disciplinary collaboration..

Offer a model of local content learning materials and maps that can be synergized with customary ethnicity based on ecological intelligence of elementary and high school students community in South Sulawesi, Indonesia. For example, the application can be used in several indigenous peoples for schools/educational institutions.

6	Resisting Modernization	Why not refuse? What is the basic reason for rejecting modernization? Are all in their lives not using modernization, such as electricity, mobile phones, household appliances, and will there be other stimulus responses if there is an attraction conveyed by the teaching staff.
7	Limit strong discussions and give soft ones	Teachers can provide soft discussions, adjusted to their school level according to their needs.

Local content is part of the curriculum that allows students to learn based on their potential and regional needs (Permendikbud No. 79 of 2014). Local content based *on ecopedagogy* can increase students' awareness of environmental conservation through a project-based approach and nature exploration (Gadotti, 2008). Other research related to environment-based learning in local content has a positive impact on students' attitudes and behaviors: Utami (2019) found that ecological project-based learning increases students' awareness of waste management in elementary schools. Rahman & Sari (2021) show that the integration of local wisdom in local content helps students understand the value of environmental sustainability. Supriatna with his book

'ecopedagogy builds ecological intelligence in social studies teaching' and several studies in the form of journals, books and reports show that local content is important and has positive value for students.

Table 3.1 *Illusion of Teaching Materials*

(Ethnicity of the Kajang Indigenous People, Bulukumba)

Yes	**Naming of Teaching Materials**	**Treatment**
1	Origins of Villages/Customary Areas	Can provide a 5-10 minute introductory story to start; Documentary film screening media, both offline and online, to strengthen the interest of material objects; Provide knowledge to conduct evaluations; Evaluation materials, materials and evaluations.
2	Structure of Kajang Dalam Traditional House	Can provide a response stimulus; Visiting Custom Locations; By visiting can provide nature knowledge, by seeing directly, having direct dialogue, experiencing the view of nature, of course there is a special impression for students.
3	Craft	What makes them survive while not having much contact with the global community, lagging behind global information and focusing on harmony between sesame, nature and creator snag. Why? It can be a discussion material for junior and senior high school students.
4	Ceremony	Why do they perform the ceremony? How to manage their farms and rice fields, without technological sophistication What is the Religion of the Society

5	Religion	What religion do they follow; What beliefs characterize the ethnicity of the nation;

Finally, we will show some field data used by the South Sulawesi community:

Figure 3.1 *Traditional Knowledge of Some Tribes in Indonesia.*

	Jam 06.00 – Pukul 17.00											
	6	7	8	9	10	11	12	13	14	15	16	17
minggu	R	X	O	R	X	R	S	R	O	R	S	r
rSoenin	R	X	O	X	X	X	R	S	R	X	X	r
Selasa	X	R	X	O	R	X	R	X	R	O	R	O
Rabu	O	R	O	R	X	R	O	X	R	X	O	O
Kamis	R	X	R	X	O	R	S	R	X	R	X	S
Jumat	X	O	R	X	R	X	R	X	O	R	X	O
Sabtu	S	r	x	R	o	O	r	S	R	X	r	x

Keterangan: R = Reski (Dalle) X = Bahaya 0 = Nihil S = Selamat

Some critics—often lacking cultural grounding or ecological perspective—may dismiss traditional practices as mere myths, obsolete rituals, or mystical relics of the past. In the context of rapid modernization and technological advancement, such views tend to marginalize the value of indigenous knowledge systems. However, the data presented in this study clearly indicate that these practices represent a form of ecological intelligence rooted in lived experience and long-standing environmental interaction. As Goleman (2010) posits, ecological intelligence entails the human capacity to perceive environmental interdependence and to adapt behaviors in ways that sustain ecological balance. Similarly, Gardner (2013) emphasizes naturalist intelligence as the ability to interpret and respond to natural phenomena with ecological awareness and expertise.

4. Conclusion and Suggestion

Traditional agricultural practices, time reckoning based on celestial cues, and the symbolic meanings embedded in cultural ceremonies are not archaic superstitions; rather, they are sophisticated systems of knowledge that have ensured ecological sustainability for generations. In particular, farming communities demonstrate remarkable accuracy in seasonal forecasting, soil preservation, and communal water use—skills developed without modern technology but informed by deep ecological insight.

In light of this, it is imperative for institutions, educators, and policymakers to recognize that local content education (muatan lokal)—as a carrier of traditional knowledge—must not be eroded by the homogenizing forces of modernization. Rather than positioning tradition and technology as opposing forces, this study advocates for a strategic integration through digital literacy. Advanced technological tools, including multimedia production, digital archives, and interactive storytelling platforms, should be employed not to replace but to preserve and revitalize these knowledge systems.

Indeed, no matter how advanced modern technology becomes, it cannot recreate cultural heritage once it is lost. What digital literacy offers is a bridge—a means to archive, reinterpret, and transmit traditional knowledge to future generations in a format they can engage with meaningfully. Therefore, the call is not merely to preserve, but to digitally conserve and ecologically revitalize traditional knowledge for a sustainable cultural future.

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